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### **HEAD-STABILIZED MEDICAL APPARATUS, SYSTEM AND METHODOLOGY**

#### **Cross Reference to Related Case**

This application is a continuation-in-part of U.S. Patent Application Serial No. 10/188,564, filed July 3, 2002 by John M. Epley for "Comprehensive Vertigo Management", now U.S. Patent No. 6,800,062 B2, issued October 5, 2004. The entire contents of that prior case are hereby incorporated herein by reference.

#### **Background and Summary of the Invention**

The present invention involves a head-stabilized method and apparatus designed for the diagnosis and treatment of vestibular disorders involving symptoms of dizziness, vertigo and/or imbalance. It also relates to the structures of certain special devices that are particularly suited for use with this method and apparatus, and to certain procedural approaches that the structure and method of the invention make advantageous.

In a manner of speaking, the invention recognizes, and centers attention on, the discovered significance of utilizing various, plural-simultaneously-employed sensors/detectors which are specially positionally stabilized, both (a) with respect to the head of a patient, and (b) with respect to each other, for the simultaneous gathering, and immediate computer processing, of plural-parameter data which can lead to accurate diagnoses and treatment of disorders of the types just generally mentioned above. Both mentioned categories of stabilization have been found to be important and unique in this sophisticated and challenging field of medical practice. Positional stabilization, undertaken in accordance with practice of the invention, leads to accurate correlation of different simultaneously gathered data components, and thus leads, in turn, to significant improvements in diagnostic speed and accuracy, and in trustable opportunities to rely with confidence on rapid, computer-based vestibular analyses and conclusions.

Dizziness, including vertigo and imbalance, is one of the most common complaints presenting to the physician. Although these symptoms may be caused by a variety of abnormal conditions affecting either the peripheral or central nervous systems, the cause can most commonly be traced to abnormalities involving the vestibular

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represented by a dashed block 48 in Fig.1. Computer 46 is user controllable via an appropriate user controller represented by a block 50 in Fig. 1 which is labeled CONTROL. An appropriate monitor screen-display device 52 (or more than one such device, if desired) is coupled to computer 46 for presenting various visual output information to a user of the system. While only a single display device is thus specifically illustrated, it should be understood, as just above suggested, that plural display devices may be coupled to computer 46. It should also be mentioned that an appropriate display device might be directly connected to camera 28, if desired. A later herein presented description of a typical use of the invention specifically includes an illustration of this option.

Appropriately interconnecting computer 46 with whatever devices are employed in conjunction with headgear apparatus 20 is what is referred to herein as a communication structure 54. This structure is entirely conventional, and might either be a form of hard-wired structure, or a form of wireless communication structure, or some combination, for example, of the two of these things.

As can be seen with respect to Fig. 2, each one of the various several devices that have just been mentioned above in relation to Fig. 1 is represented in block form in Fig. 2. Single ended arrows extend to and from these block illustrations to represent, generally speaking, the direction of parameter data flow. The bracket presented centrally in Fig. 2 represents a selected communication structure 54 which extends between these block-represented devices and previously mentioned computer 46. One exception here is that the ~~two arrows~~ single arrow which ~~are~~ is associated with combined sound and air-pressure deliverer

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36 34, labeled SOURCE, represents appropriate sound, and/or air-pressure controlling, sources.

Included in Fig. 2 is a block 55 which is labeled OTHER DEVICES. Two dashed-line arrows, one pointing inwardly toward block 55, and one pointing outwardly from the block are associated with this block. Block 55 represents the recognition that various sensor and stimulator devices other than those specifically listed herein, such as a device for introducing galvanic stimulation, and a device for introducing caloric stimulation, may readily be employed if desired.

At the bottom of Fig. 2 there is a block which is labeled FLUIDS, and this represents a source and return reservoir of fluids supplied to and drawn away from, as appropriate, device 36 when that device is being employed as a fluid-flow structure. A single-headed arrow pointing into the right side of this block, labeled CONTROL, reflects a connection through the communication structure to computer 46, whereby this computer, monitoring nystagmus behavior in a subject, is enabled to control the delivery of fluids, for example, to one of a subject's ears via device 36.

In very general terms, when the apparatus and methodology of the present invention are to be employed with respect to a particular human subject, that subject is equipped with headgear apparatus like that illustrated in Fig. 1, which apparatus is then suitably communicatively coupled to a computer, such as computer 46, which is under user control by a user controller such as that represented by block 50. Computer 46 provides an appropriate output display on a monitor device, such as that shown at 52. With regard to a particular practice of the invention, the professional user (physician, clinician, etc.) of the invention selects the devices which are to be employed, one of